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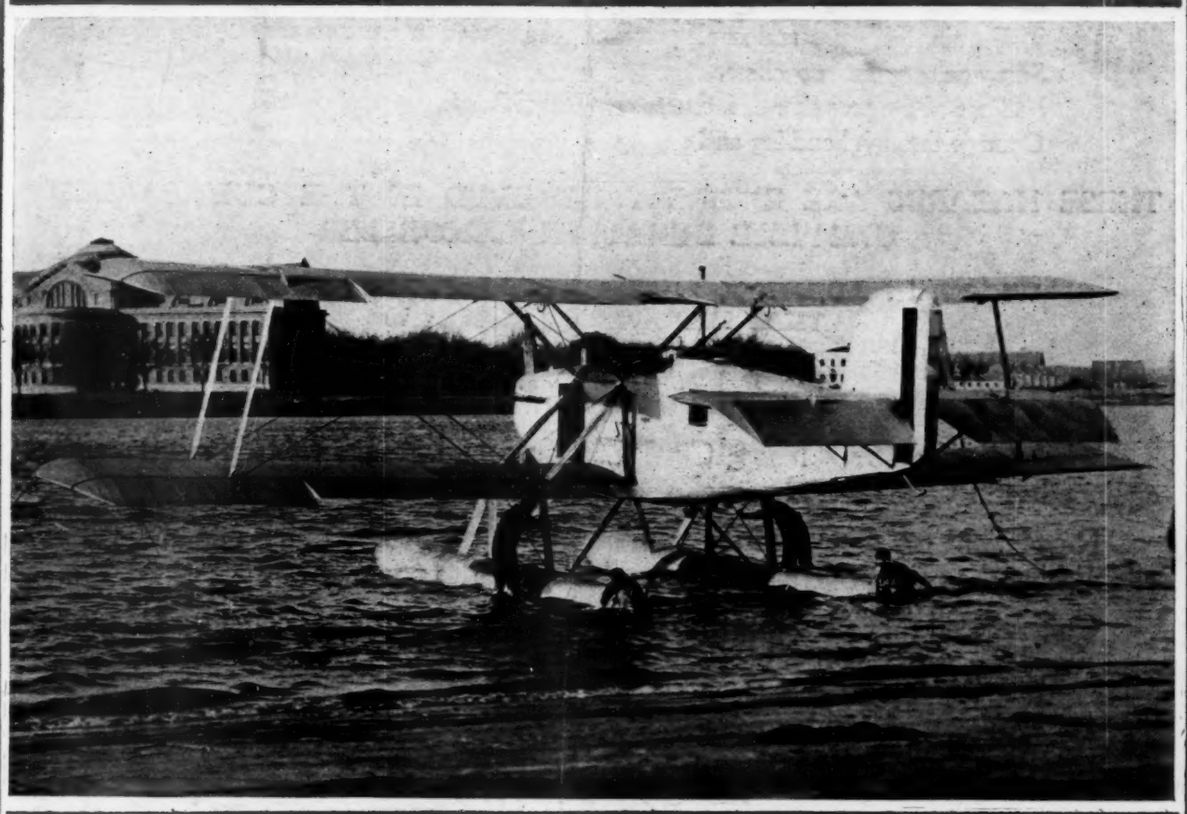

...y Curtiss three-purpose plane (Wright T2 engine) of torpedo launching, bombing and long range sco...

VOLUME XVI

NUMBER 2

SPECIAL FEATURES

AMERICAN AERONAUTICS IN 1923

CALIFORNIA STUDENTS BUILD GLIDER

ANNUAL REPORT ON THE NAVAL AIR SERVICE

LIEUT. MACREADY'S ATTEMPT FOR ALTITUDE RECORD

THE GARDNER, MOFFAT CO., INC.

HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office at Highland, N. Y. under Act of March 3, 1879.

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FOR WINTER TRAINING AND FLYING, WRITE
THE CURTISS-FLORIDA AVIATION CAMP, AT MIAMI, FLA.

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IN FAR AWAY CHINA

AVIATION Readers Encircle the World

The following letter has been received from Canton, China. It is typical of many that are received from readers throughout the world and shows how indispensible AVIATION is if a complete picture of the progress of American aeronautics is desired.

From an old Subscriber

"Enclosed please find ten dollars for which please renew my subscription to AVIATION. In the event that you have discontinued sending the magazine to my old address, please if possible send me the copies I have missed. AVIATION has been my greatest authority since the grass-cutter days of '16, as production manager of —— Works building airplanes during the war and later as field manager of a division of the Air Mail and now as aeronautical advisor to Dr. Sun Yat Sen in far away China.

"I have been a subscriber to your magazine since it was first published, in fact, I still have my first copy, now seven years old as well as all copies up until the time I came here.

"I have certainly derived great pleasure and much valuable information from your indispensable paper."

Are You a regular Subscriber ?

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The GARDNER, MOFFAT CO., *Inc.*

225 FOURTH AVENUE NEW YORK

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T-2	T-3
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600 H.P. high speed	*650 H.P. high speed*
Weight 1150 lbs.	*Weight 1150 lbs.*

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Vol. XVI JANUARY 14, 1924 No. 2

The Battleship and Aircraft

IN a number of recent articles naval officers have made the statement repeatedly that "air enthusiasts" or "air radicals" desire to scrap battleships and rely entirely on aircraft for the protection of the country. With this as a basis of their argument they then proceed to show how impossible this would be in practice. We do not believe that the advocates for aircraft do desire to scrap battleships and in this connection we quote a recent statement of Rear Admiral W. F. Fullam who has probably taken as an advanced position in regard to aircraft as any "air enthusiast." "The writer does not advocate," he says, "and never has advocated the scrapping of our present battle fleet. It has simply been urged that we have enough battleships; that they are menaced by modern weapons, that a new type may appear during the naval holiday, and that every available penny should at this time be devoted to submarines and air forces which are lacking or insufficient in our fleet."

In fairness, the battleship defenders should not misstate the attitude of the air people in order to create hostility to our air development. They will have cause to regret this attitude if they continue it. Admiral Fullam who has lived with these naval officers all his life refers to them as "steeped in conservatism, with their brains encased in armor as thick as that of a sixteen-inch turret, into which a modern idea could not penetrate, with their vision of the naval world and their conception of new weapons limited by the little peephole of a turret or the narrow slit of a conning tower, they could see and think of nothing and advocate nothing but battleships, battleships, battleships !"

Several years ago it was difficult to get a naval officer to admit that aircraft were even to be seriously considered. The classic challenge of Secretary Daniels to "Admiral" Mitchell, as the General was called by him at that time, will always mark the end of denial period. Since then and after the battleship bombing tests, the word "adjunct" has become the usual term to use in connection with aircraft. This is a distinct advance and comes near to being the exact truth as far as the development proposed by the Navy is concerned. But the next point to be argued is how much should be spent on this "adjunct" in proportion to naval expenditures. We maintain that $12,000,000 to $15,000,000 will not be enough even to protect the fleet, not to mention the offensive uses in which aircraft could be employed.

What is to be feared is an undue amount of money being spent to strengthen battleships whereas the same amount spent on aircraft might produce greater results. As Admiral Fullam again states: "Today we still find ourselves without the naval weapons which should have been provided in 1920. Only recently the proposition was revived after it had been buried under a load of logic, to spend from $6,000,000 to $60,000,000 in mangling gun turrets to elevate their guns and to add blisters and plasters to our battleships in vain attempts to defend them against submarines and air forces."

Aircraft proponents do not want battleships scrapped but they do want an air force which will be able to defend the fleet and then if it can be demonstrated that bombs and torpedoes can do what it is believed they are capable of accomplishing it will be time enough to get into a discussion of the relative power of battleship fleets and aircraft fleets.

Our Wanting Air Policy

COMMENTING on the speech of the Duke of Sutherland at a dinner party tendered in his honor, Representative Roy G. Fitzgerald, of Ohio, leading advocate in Congress of aviation development as a most important arm of national defense, stated in an interview with a representative of the Washington *Star*, that the United States, with neither military or civil air policy, is exposing a great industrial area to bombing attacks by airplanes taking off from a hostile fleet beyond our coast defenses.

"The United States has no military air policy," Representative Fitzgerald complained. "Our great industrial area is within the radius of action of present day bombing airplanes launched from a hostile fleet lying off our coasts. The lack of a proper military air policy leaves this area undefended from hostile air attack.

"While, in 1920, Congress passed and the President approved an act giving to the Army Air Service control of all aerial operations from land bases, neither aircraft nor personnel nor facilities adequate for the defense of our coastal areas have been provided the Army Air Service. Apparently Congress has been bewildered by the continued request of Naval Aviation for shore stations dotting our coasts, and because of the duplication of the mission assigned the Army, apparent in such installations, has refused to provide adequately for either service.

"This situation apparently is due either to the indecision or inertia of the War and Navy Departments, who maintain, despite the will of Congress, a joint policy which not only permits but directs operations by naval aircraft from shore stations. It is apparent that Congress must speak so plainly that our military services will no longer disregard their expressed will and when Congress speaks it should authorize and appropriate for the Army Air Service personnel and money sufficient to insure the adequate defense of our coastal areas.

"It is believed that our inertia in the development of commercial aerial transportation is due not to the hesitancy or to the lack of enterprise of the American people, but to the failure of Congress to provide regulatory laws."

Representative Fitzgerald's views on our wanting air policy should be of timely interest to Congress.

The United States Naval Air Service, 1922-23

Numerous New Types of Aircraft and Engines Developed For Naval Requirements

A comprehensive review of the activities of the U. S. Naval Air Service during the fiscal year ended June 30, 1923, is contained in the annual report of Rear Admiral William A. Moffett, chief of the Naval Bureau of Aeronautics, to Secretary of the Navy Denby. The report is quoted below in part.

The bureau organization is divided into four principal divisions under the chief of bureau and assistant chief of bureau. The four divisions are: (1) Plans, (2) Administration, (3) Material, (4) Flight.

Fleet Air Squadrons

Aircraft squadrons, scouting fleet.—The following squadrons composed the aircraft squadrons, scouting fleet:

Scouting Plane Squadron 1, eighteen F5L's.
Torpedo and Bombing Plane Squadron 1, eighteen PTP's.
Kite Balloon Squadron 1, four kite balloons.

The U.S.S. Wright was the squadrons' flagship throughout the year and was the base for personnel and material for Scouting Plane Squadron 1. Until Dec. 31, 1922, when transferred to the naval air station, Hampton Roads, Kite Balloon Squadron 1 was also based on the Wright.

Torpedo Plane Squadron 1 based on the naval air station, Hampton Roads, except for the time occupied by winter maneuvers at Key West.

The U.S.S. Sandpiper and U.S.S. Teal were assigned to the aircraft squadrons as additional tenders.

Mine Squadron 1, scouting fleet, was assigned to assist the aircraft squadrons during their cruise to Key West and Panama and their return to Hampton Roads.

Aircraft squadrons, battle fleet.—The following squadrons composed the aircraft squadrons, battle fleet:

Torpedo and Bombing Plane Squadron 2.
Observation Plane Squadron 1.
Observation Plane Squadron 2.
Observation Plane Squadron 3.
Fighting Plane Squadron 1.
Fighting Plane Squadron 2.
Fighting Plane Squadron 3.

The U.S.S. Aroostook was squadron flagship throughout the year and was base for such personnel and material as could be accommodated. Other personnel and material were temporarily based at San Diego, Calif. The U.S.S. Gannett was assigned as an additional aircraft tender throughout the year.

Air Bases and Air Stations

The following activities were authorized for the fiscal year:

(1) For support of operations of fleet aircraft squadrons:
- Naval air station, San Diego, Calif.
- Naval air station, Hampton Roads, Va.
- Naval air station, Coco Solo, Canal Zone.
- Naval air station, Pearl Harbor, Hawaii.

(2) Inactive coastal air stations:
- Naval air station, Chatham, Mass.
- Naval air station, Cape May, N. J.
- Naval air station, Rockaway, Long Island, N. Y.

(3) Miscellaneous:
- Naval air station, Anacostia, D. C. (for experimental work).
- Naval air station, Lakehurst, N. J. (rigid airship construction).
- Naval aircraft factory, Philadelphia, Pa.
- Naval air detail, Newport, R. I. (experimental torpedo work).
- Naval air detail, Dahlgren, Va. (experimental ordnance work).

(4) For training personnel for aeronautic duty:
- Naval air station, Pensacola, Fla.
- Aviation mechanical school, Great Lakes, Ill.
- Postgraduate detail.

(5) An inspection service covering all aircraft and accessories manufactured under contract for the Navy.

(6) Helium plant at Fort Worth, Tex.

The report states that there are 600 officers in Naval Aviation of whom 375 are flying officers. The enlisted personnel numbers 3,716.

Detailed accounts are given of the transcontinental flight of Lieutenants Wyatt and Owen, rescue work, seaplane mail, and the records made by Naval Aviation in race meets during the year.

The aircraft squadrons with the scouting fleet were active in all the practice maneuvers of the fleet. The Torpedo and Bombing Plane Squadrons were very successful in their maneuvers.

On Sept. 26, 1922, special torpedo practice was carried out against three battleships of the scouting fleet, maneuvering about 80 mi. east of Cape Henry. Eighteen planes rigged with torpedoes were used in this attack. All planes were successful in reaching the target; seventeen torpedoes were launched, one release failing to function. All torpedoes made 100 per cent runs and crossed the line.

Although the Langley has been designated for the flagship of Aircraft Squadrons, Battle Fleet, necessity for developing gear for carriers has operated to keep the ship on independent duty for experiments only. The operation of sending off a flight of three to four planes from the ships' deck and receiving them back aboard in the arresting gear has become a common occurrence. However, there are many problems left which it is desired to solve previous to the completion of the new carriers.

Itemized List of Casualties

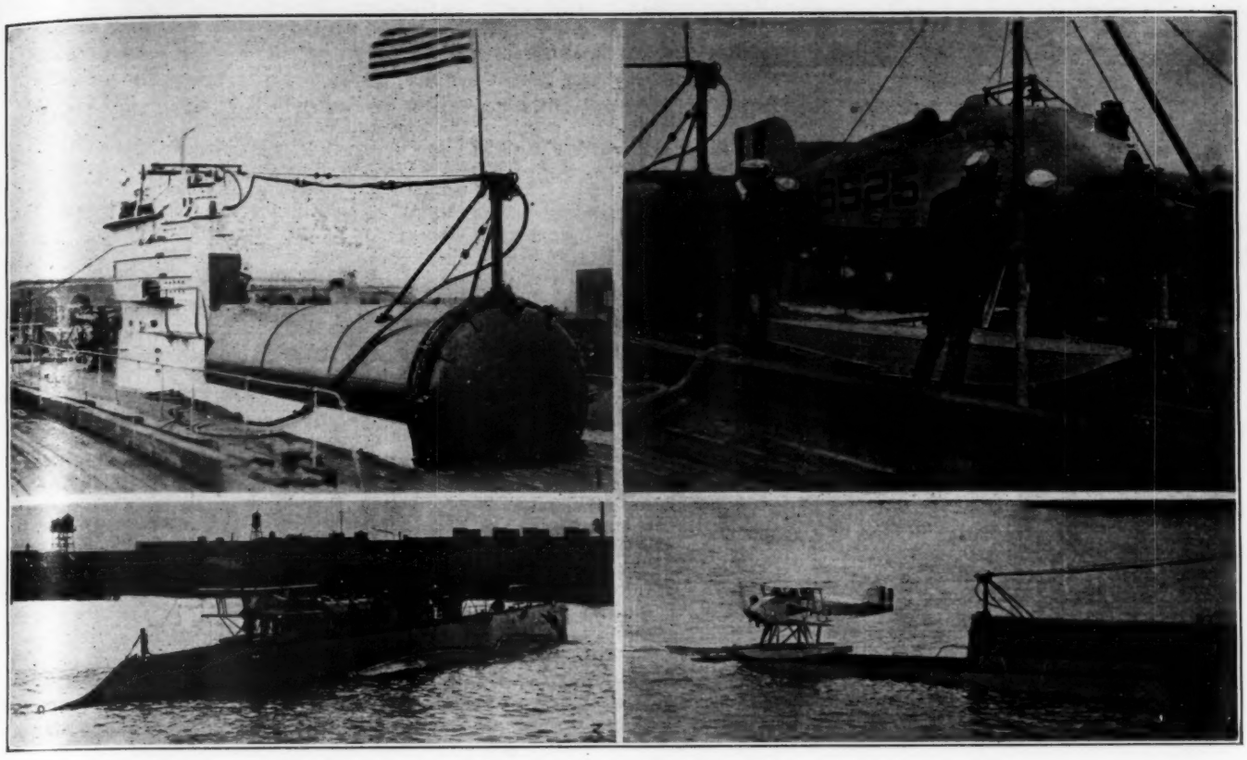
The flight operations of Naval Aviation show 64,353 flights with a total duration of 43,314 hr. The Marines made 14,146 flights with a duration of 8,690 hr. In lighter-than-aircraft there was a total of 1,212 flights with a duration of 582 hr.

The casualties aggregated 24 deaths, or one fatality to every 126,333 mi. flown.

Following is a detailed statement of these casualties:

CAUSES OF CRASHES, HEAVIER THAN AIR ONLY

Hazards of operation:		
Bad landing	19	
Collision (while taxiing)	10	
Spin	8	
Stall	6	
Bad take-off	6	
Weather conditions	6	
Nose dive	4	
Poor pilotage	4	
Glassy water	4	
Side slip	3	
Gasoline exhausted	3	
Terrain conditions	3	
Collision (in air)	3	
Skid	2	
Fire (on water)	1	
Fire (in air)	1	
Crossed aileron controls	1	
Poor visibility	1	
Water in gasoline	1	
Interference with controls by passenger	1	
Total due to hazard of operation		87
Power plant failure:		
Propeller	4	
Engine parts	3	
Overheating	3	
Ignition system	3	
Carburetion	1	
Stoppage in gas feed	1	
Not known	2	
Total due to failure of power plant		16
Structural failure:		
Pontoon	5	
Landing gear	2	
Wings	2	
Total due to failure of airplane structure		9
Arresting gear failure	2	
Not known	7	
		9
Grand total		121



Official Photo, U. S. Navy

How the submarine plane operates—1, tubular hold for storing seaplane on U. S. submarine S-1; 2, Glenn Martin submarine plane being assembled on the deck of S-1; 3, the plane ready for flight; 4, submarine submerging to bring the plane afloat for its take-off

	Number	Percentage of total
Hazards of operation	87	72
Power plant failure	16	13
Structural failure	9	7½
Arresting gear failure	2	1½
Not known	7	6
Total	121	100

Within the past year the flying in the fleets has been nearly doubled, 19,936 hr. in 1923 against 10,438 hr. in 1922. This is the end to which the bureau has consistently been working, and the results of these endeavors are now becoming evident.

Training activities for the past fiscal year were centered principally at the naval air station, Pensacola, Fla., and at the Aviation Mechanics' School, Great Lakes, Ill.

The naval air station, Pensacola, exists principally for the purpose of training naval aviators, naval aviation pilots, and naval aviation observers. To this end there is included in the station organization a group known as the aviation training schools. The aviation training schools are subdivided into the following: Ground school, flight school, gunnery school. For qualification as a naval aviator, a naval aviation pilot, or naval aviation observer it is necessary that the student pass through all three of these schools. In addition to these three schools there are maintained a torpedo and bombing school, an observation school, and a combat school.

Material Activities

The Bureau of Aeronautics has followed the policy of encouraging design and invention outside the naval service, but has taken great care to maintain a sufficiently expert design staff so that the Navy would never be entirely dependent upon or forced to accept only such designs as might be submitted by contractors.

In the same way, while the procurement of aircraft is normally handled by contract after competitive bidding, the war showed the necessity for controlling the production of a portion of the Navy's requirements for aircraft, and the naval aircraft factory was created and has been maintained in an active but reduced operating status. Since the armistice this plant has only been operated at a fraction of its capacity, and the space so made available used for storage of surplus aircraft material. It is the general base storehouse for all naval aircraft material, and with the reduction of the number of air stations it has been necessary to unload on the aircraft factory large quantities of material left over as a result of war-time activities. The naval aircraft factory furnishes a place where repair, overhaul and emergency work can be handled promptly; where experiments of a confidential nature can be undertaken under the direction of naval personnel, and where the manufacture from time to time of standardized aircraft may be undertaken in order to obtain reliable information as to cost. The saving due to construction at the aircraft factory has been appreciable, and the construction there of certain standard types has served to check any possible tendency of contractors to maintain high prices in spite of the evident decrease in labor and material markets. It is the bureau's policy to encourage aircraft manufacturers in every practicable way, but at the same time to authorize when necessary a sufficient amount of production at the aircraft factory to safeguard the Government's interests relative to cost and time of construction, and to stabilize the labor turnover. This institution is becoming more and more a naval aircraft establishment engaged in experimental work, repair and overhaul for the service, and the general storehouse for aviation activities.

Since the armistice there has been a relatively great change in naval aeronautics. During the war every effort was made to produce aircraft for countersubmarine work and for convoy and patrol duty. This led to the development of large flying boats and nonrigid airships. These types now exist in a fairly satisfactory state of perfection, and attention has been diverted from them to the development of aircraft suitable for use with the fleet.

The *raison d'être* for the Bureau of Aeronautics and all of its activities is to furnish to the fleet proper types of satisfactory construction for naval aerial development and use. Fleet aviation requires small and handy combat planes of high performance to be carried with the fleet; planes for scouting, observation, and spotting gunfire, and torpedo and bombing

planes for offensive use against an enemy fleet. The development of these types has been pushed vigorously throughout the year, and there are actually in existence and in operation today a number of designs which the bureau believes give great promise of fulfilling the needs of the fleet.

Carrying Planes with the Fleet

Simultaneously with the development of special aircraft for fleet work, the problem of carrying these planes with the fleet has received consideration. It is obvious that aviation can be of only slight assistance to the fleet until such time as it can accompany the fleet to any part of the world. In home waters large flying boats working from harbors and bases on shore have proved serviceable, but in order to carry fighting, spotting, and torpedo planes with the fleet it is necessary either to carry the planes on regular ships of the fleet or on special aircraft carriers. It is appreciated that carrying aircraft on warships involves many difficulties, due principally to the necessity for making no serious compromise with the fighting efficiency of the ship. This requires that fleet aircraft be small and compact. It has not only been proved possible but also entirely practicable to launch planes by means of catapults, and the installation of these catapults has been authorized by the department on various types of ships, and many of these installations have already been satisfactorily made.

Successful efforts have been made during the year to develop a suitable fighting plane for the fleet which is small enough to be handled by ships, rapidly taken down and set up, and provided with special arrangements for landing on the water and hoisting aboard.

As to spotting and observation planes, experience in the battle and scouting fleets has furnished sufficient information to proceed with the construction and delivery of several types which should fulfill the requirements of the fleet.

The development of a suitable torpedo plane has proved extremely difficult in view of the necessity for obtaining a small and compact plane which will, nevertheless, carry the standard torpedo. Five different types of experimental torpedo planes have been constructed. One type has proven sufficiently satisfactory to warrant going into production, and this type is now available for use in the battle fleet and scouting fleet.

Experimental Work

Experimental work during the past year has been along the following lines:

Metal construction for airplanes.—Progress has been made during the year in metal construction, although the high cost of this type construction and the various problems incidental to metal construction have prevented rapid advancement. Several contracts have been let to manufacturers for the building of all metal and composite airplanes and for the construction in metal of various airplane units. The naval aircraft factory is building an all metal airplane and several types of metal floats in addition to the metal construction with rigid airships. Several representative metal airplanes from foreign manufacturers have been obtained to study methods of construction and this information is available to the industry. The use of metal hulls for boat seaplanes offers particularly attractive possibilities.

Metal propellers.—The possibilities of the use of steel and duralumin propellers have been investigated, and contracts for experimental propellers entered into. Several have been used in flight, and sufficient success experienced to warrant continued experimentations.

Launching and arresting.—The experimentation in connection with the launching and arresting of planes on shipboard has been continued throughout the year. Arresting problems have been investigated on the U.S.S. Langley and the experimental turntable at Hampton Roads. Catapults are already intalled on several battleships and cruisers.

Construction Projects under Way

The following types of aircraft, subdivided according to class designation, are in the course of construction:

(1) *Class VF, fighting planes.—(a)* CR3, single-seater seaplane. CR2 airplanes are being converted into two CR2 seaplanes.

(b) NW2, single-seater seaplane. The NW1 airplane is being converted into the NW2 seaplane. The wing structure is being changed to a conventional biplane construction, and wing radiators are being substituted for Lamblin radiators.

(c) R2C1, single-seater land-type airplane. A high-speed racing and fighting airplane built around a special Curtiss D12 engine and involving improvements and experience gained in the CR series of airplanes.

(d) TX1, single-seater land-type airplane. A high-speed racing and fighting airplane built around the Wright T2 engine. Use has been made of the T2 engine installation in the model NW2, although the general design of this airplane is entirely different.

(e) TR3A, single-seater seaplane. This is a modification of the TR3 to obtain a greater high speed. The wing area has been reduced, wing radiators added, and a Wright E4 engine substituted for the E2.

(f) UF1, single-seater convertible biplane type. Construction has been delayed due to changing from the Aeromarine U873 to the Lawrance J1 air-cooled engine.

An All-Metal Plane

(g) F4C1, single-seater land-type airplane. This is an all metal airplane, built according to the general design of the model TS, and will furnish valuable comparative data as to costs, weights, performance, and maintenance.

(h) HPS1, single-seater convertible airplane. A monoplane having internally braced cantilever wings embodying the Handley-Page patented wing device for increasing speed range.

(2) *Class VO, observation planes.—(a)* NO1, three-seater convertible airplane. Being built by the naval aircraft factory and the L.W.F. Corp., according to the same general design as the model M2O1.

(3) *ClassVS, scouting planes.—(a)* CS1, two-seater convertible airplane. A three-purpose airplane designed to be converted from a scout to a torpedo plane or bomber. Equipped with standard Wright T2 engine, and, as a seaplane, with twin floats.

(b) CS2, two-seater convertible airplanes. Modification of the CS1 for long range scouting duty. A special T2 engine is to be used, fuel and oil capacity greatly increased, and wing radiators used.

(c) CS3, two-seater convertible airplane. This airplane is the same as the CS2, except that a geared T2 engine is to be installed.

(4) *Class VP, patrol plane.—(a)* PN7, flying boat. A modification of the F5L and designed to be used either as a patrol plane or as a bomber. By the use of a thick high lift airfoil the wing area and the span have been reduced. This allowed a general cleaning up in the design of the wing structure and the elimination of many struts and wires. The new wing structure, together with new engines of greater horsepower, will result in improved performance.

(5) *Class VN, training planes.—(a)* N2N, two-seater seaplane. A training plane of conventional design for instruction in flying and gunnery.

(b) HN2, two-seater convertible airplane. A modification of the model HN1 for instruction in flying and gunnery.

(c) TG1 and TG2, two-seater seaplanes. These seaplanes are to be used for instruction in flying and gunnery. The TG2 has the main fuel tanks located in the floats, whereas in the TG1 they are located in the fuselage.

(6) *Class VM, marine expeditionary plane.—(a)* NM1, two-seater convertible airplane. An all-metal airplane to be used for marine expeditionary operations.

(7) *Class VJ, transportation plane.—(a)* Dornier "Libelle" three-seater boat seaplane. An all-metal boat seaplane which should be interesting in connection with metal construction of hulls.

Aircraft Power Plants

Regarding aircraft power plants used by Naval Aviation, there is a wide diversity of types ranging from 60 to 700 hp. A number of these types are semi-experimental; others are obsolescent or obsolete. There are available five distinct proved types covering the entire range of power requirements from 60 to 600 hp. and thoroughly suited to the needs of all classes of Naval Aviation service. Each of these five types is

at present in production in limited quantities, in plants capable of rapid expansion. In case of need, production of any or all the types indicated can be begun instantly in any quantities desired. These five models, as well as other more experimental types noted, are in a healthy state of continuous development. At least two models are, as a matter of policy, kept active in each class, a policy which fosters keen competition among builders and continuing endeavors on the part of each to better his product.

One of the outstanding results of the past year's work has been the decision to abandon definitely the use of water-cooled engines of less than 300 hp. in future naval aircraft construction. It will be recalled that the probability of such a decision was predicted in the previous annual report. Development of direct air-cooled engines, and particularly of the Lawrance model J1 200 hp. engine, has progressed rapidly during the past year, and engines of this type are rapidly taking their place in service.

Air-Cooled Engines Reliable

The development of the direct air-cooled engine to the point where, in dependability and in all-round serviceability, it compares favorably with the more commonly used water-cooled types, is an accomplishment of the greatest importance to our aircraft operations, because it permits the complete elimination of the weight and complication entailed in the water, radiator, piping, fittings, and accessories required in the cooling system of the water-cooled engine. The weight of the cooling system of the water-cooled engine is usually in excess of 25 per cent of the weight of the engine itself.

The development of truly dependable and serviceable power plants for aircraft has passed out of the state of invention and definitely entered into the state of engineering development. From a general survey of the whole engineering field there appears to be little prospect, in the near future at least, that any revolutionary invention will appear to take the place of the present more or less convenitonal practices. There should be, however, in every year, a very distinct improvement in existing types. In reviewing the experimental development work in the power-plant field for the past fiscal year, it is very gratifying to be able to report that all types of aircraft which are now being issued for general service use are equipped with power plants which weigh less per horsepower, which are more dependable, which have a longer life between overhauls, and hence lower maintenance costs, and which are on the whole, more economical in fuel consumption than have been the power plants used in service types of aircraft in the past. Experimental and development work which is now in course in various stages of completion points very clearly to further improvement during the coming fiscal year. It is confidently stated that in case of war the aircraft of the United States Navy will be equipped with power plants which will, at worst, not be inferior to those installed in any aircraft which may be encountered in any phase of naval operations.

Marine Corps Aviation

The aeronautic organization of the Marine Corps on shore comprises the following:

(1) *First Aviation Group, marine barracks, Quantico.*—Two squadrons and one balloon squadron with necessary headquarters units, as follows:—

(*a*) Observation Plane Squadron 3 (VO Squadron 3), composed of three active divisions.

(*b*) Fighting Plane Squadron 1 (VF Squadron 1), composed of three divisions, two of which are active and one inactive.

(*c*) Kite Balloon Squadron 1 (ZK Squadron 1), composed of one division, of which one section is active and two inactive.

(2) *Observation Plane Squadron 1* (VO Squadron 1), Santo Domingo City, Dominican Republic, composed of three divisions, of which one is active and two inactive.

(3) *Scouting Plane Squadron 1* (VS Squadron 1), Sumay, Guam, composed of one division of two active and one inactive sections.

(4) *Marine Flying, Parris Island, S. C.* There are no activities at this field.

There are 58 officers and 712 enlisted men in the aviation personnel of the Marine Corps.

The United States Army Air Service has cooperated constantly with the Navy in the matter of material supply, the subject of training, and questions involving experimental work. Parachute training and instruction have been continued and the Navy has adopted the Army standard type of parachute. Development work is being continued along this line by both services, each being kept in touch with the results obtained by the other.

Cooperation with the Army Air Service

Methods of purchases, means of procedure, and operations governing purchase of aviation materials have been carefully gone over and discussed from time to time in order that the best interests of both branches of the Government may be satisfactorily cared for.

The interchange of material as needed has been carried out whenever practicable. The interchange of design and development data has continued satisfactorily throughout the year. The interchange of information obtained from foreign sources has also proceeded satisfactorily.

Particular attention has been given to the question of making joint purchases whenever practicable, and a joint use of the inspection force available has been satisfactorily carried out where joint purchases have been made.

Questions of interest to the Air Service of the Army and the Navy are referred to the Joint Aeronautical Board for decision.

Appropriations and Expenditures

The appropriation bill for the naval service for the year ending June 30, 1923, carried under the appropriation, "Aviation, Navy" a total of $14,683,950. In addition there was available to the bureau money under the 1922 appropriation to complete work authorized at naval establishments. Expenditures on this work were $751,681.71; expenditures and obligations under the appropriation, "Aviation, Navy, 1923," were $14,489,897.10, making the total cost of naval aviation under the Bureau of Aeronautics, $15,241,515.81.

Use of Surplus War Stocks

One of the greatest difficulties experienced by Naval Aviation in maintaining its activities and keeping within the appropriation is the decreasing amount of surplus war stock remaining available for use. In past years about 50 per cent of the bureau expenses have been met by surplus war stock. As this stock is about depleted the bureau is facing a serious situation.

The total value of war stocks received by Naval Aviation was $69,452,325.05. This has been reduced to $40,332,052.44 of which $23,000,000 is obsolete or surplus, leaving a book value of $17,333,052.44 worth of surplus material. The actual valuation to Naval Aviation of the stock remaining is at the most not more than $8,500,000. It will therefore be necessary during the fiscal year 1924 to purchase much new material where previously war stock was used. By the end of the fiscal year 1924 little if any of the remaining material will be of any value.

The bureau feels that the most urgent need of commercial aviation at the present time is satisfactory national legislation covering the question of proper and adequate laws to govern all methods of transportation by air. The bureau strongly recommends that the department do everything possible to place upon the statutes of the Government adequate legislation covering this very important matter.

The situation in regard to the Naval Reserve Force is deplorable. In the event of hostilities, we must have a flying reserve of no less than 3,000 pilots. At present there is a total of but 210 aviators in classes 5 and 6 of the Naval Reserve Force. It takes at least six months to train an aviator. Should war come while there is still such a lack of reserve, Naval Aviation will be practically unprepared, for it would take a large part of our qualified aviators to train the necessary pilots. And should there be war, aviators will be needed for the immediate work in hand and no time will be available for training large numbers at the beginning of hostilities. To remedy this situation an appropriation of $1,500,000 should be included in the appropriation for the Naval Reserve Force. This will permit the training of 600 officers during the fiscal year 1925.

American Aeronautical Accomplishments in 1923

Aeronautical Chamber of Commerce of America Issues Comprehensive Recapitulation

"American aviation in 1923—the twentieth year of mechanical flight—rose to unparalleled achievements," according to a review issued by the Aeronautical Chamber of Commerce of America.

An Impressive Recapitulation

"Here is a summary of the year: Established thirty-three world records; designed, constructed and successfully operated the largest rigid airship in existence; developed and operated the first night airway, enabling the Air Mail to cross the continent in twenty-six hours; designed, constructed and successfully flew the world's largest airplane; private operators flew commercial planes a total of several million miles; staged flying meets in a dozen cities which were witnessed by a million people; further perfected the aerial torpedo; developed the smoke screen; made non-stop flights across the country; east and west and north and south; bombed battleships; improved operation of planes on and off aircraft carriers and in long cruises with the fleets; devised means to refuel planes in flight; put aircraft to work in a dozen ways, including transportation of passengers, mails and express, forest patrol, crop survey, destruction of gypsy moth and cotton boll weevil, map making, aerial photography, advertising and in other special services.

"This impressive recapitulation, however, is somewhat misleading. The records for the most part have been made by the Government services in individual machines designed and produced by the aircraft industry only in small quantities of two or three. Spectacular demonstration, commanding universal attention, cannot conceal the fact that American commercial aviation, struggling for popular recognition and conservative support finds itself five years after the Armistice, still lacking Federal air law. The Winslow Bill, establishing a Bureau of Civil Aeronautics in the Department of Commerce, which died with the Sixty-Seventh Congress, has again been placed before the Sixty-Eighth. It provides regulation and encouragement which will make practical for commerce and industry the various examples of utility illustrated during 1923.

"Of the thirty-three world records, twenty-two are credited to the Naval Bureau of Aeronautics and eleven to the Army Air Service. Of the twenty-two by the Navy, three—the world's fastest speeds—were made in land planes. The outstanding records in speed were 266.59 mi./hr. for three kilometers (1.864 mi.); 243.81 mi./hr. for 100 km. (62.14 mi.) and 243.67 mi./hr. for 200 km. (124.27 mi.), all made by Lieut. A. J. Williams, U.S.N., the first on Nov. 4 at Mitchel Field, L. I., and the other two in the Pulitzer Race at St. Louis, Oct. 6. Lieut. David Rittenhouse, U.S.N. on Sept. 28, at Cowes, England, established a new world speed record for seaplanes, of 177.38 mi./hr. He won the Schneider Trophy from French and English competitors.

Army Achievements

"The Army Air Service achievements are notable for having been made mostly with obsolescent craft improved and operated with greater skill. Records for 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 5000, and 5300 km. were made at Dayton, Ohio, and San Diego, Calif. They were accomplished, for the longer distances, through refueling in full flight, a gas tank plane passing the new supply through a hose to the lower ship. A world's duration record of 36 hr. 4 min. 31 sec. was made over Dayton, Ohio, April 16-17, by Lieuts. Oakley Kelly and J. A. Macready, U.S.A.S. But Lieuts. Lowell H. Smith and J. P. Richter, U.S.A.S., on Aug. 27-28 at San Diego, Calif., established a new duration record of 37 hr. 15 min. 43.8 sec. This was made in an Army observation plane, seven years old in design, refueled in flight. Another performance by the Army Air Service which, although not a record, constituted an unrivalled performance. Lieut. Russell L. Maughan, U.S.A.S., on July 19, flew 1930 mi., Mitchel Field, L. I., to Rock Springs, Wyo., in a new type pursuit plane. He made three stops. His elapsed time was 15 hr., or an average of nearly 130 mi./hr.

"Of the eighteen other records established by the Navy, three covered distance with seaplanes or flying boats, one a duration of 11 hr. 16 min. 59 sec., another altitude of 13,898 ft., and the remainder special performances in speed, duration and altitude with added weight.

"In the case of both the Army and the Navy, every record was made with a plane and engine American in design and manufacture.

"Two events of great significance were staged practically simultaneously. On Sept. 4, the Navy launched the rigid airship ZR1, later christened the Shenandoah. This ship, entirely of American design and manufacture, has successfully demonstrated thousands of miles of flight and marks the establishment in this country of a new phase of the aircraft industry, and led, late in the year, to the procurement by an American corporation of Zeppelin airship rights.

Sinking the Battleships

"On Sept. 5, the Air Service undertook another demonstration of the superiority of air power over sea power, and bombed and sunk the scrapped U. S. battleships, Virginia and New Jersey. The latter was attacked from an altitude of 6000 ft. and went down 7½ min. after the last bomb was released.

"The Bureau of Aeronautics, proceeding upon the Navy's theory of three-plane warfare, developed ship-board planes for installation on the capital ships, flew its fleet air forces thousands of miles up the Atlantic and Pacific Coasts and during the maneuvers in the Carribbean, and provided the aircraft carriers Saratoga and Lexington, now building, with new devices worked out through experiments on the Langley.

"Both services flew several times across the continent, Navy and Marine Corps fliers covering the distance from Haiti to the Pacific. On May 2-3, Lieutenants Kelly and Macready made a non-stop flight from New York to San Diego, covering the 2700 mi. in 26 hr. 50 min. On Oct. 25, Lieutenants Smith and Richter made a non-stop flight from Sumas, on the Washington-Canadian border to Tia Juana, on the California-Mexico line, a distance of 1200 mi. in 12 hr. 13 min. 40 sec. They were refueled twice in flight.

Commercial Flying in Sad State

"Commercial aviation, as represented by the useful peace-flying war surplus airplanes, barely held its own. About 2,000,000 mi. were flown in 1200 to 1500 machines in the hands of 600 or so pilots. Regular services were operated, in season between Cleveland and Detroit, Key West and Havana, New York and Newport, and New York and the White Mountains.

"Commercial aviation, as represented by the small operators time services to which aircraft were put by the Federal departments, made distinct progress. Foremost was the Air Mail. The year saw the illumination of the first night airway—881 mi. between Chicago and Cheyenne. On Aug. 21-24, inclusive, night flying tests in transcontinental mail were held. The record of elapsed time from coast to coast was 29 hr. 38 min. westbound, and 26 hr. 14 min. eastbound. Letters which were mailed in New York to correspondents in San Francisco on Tuesday, Aug. 21, were delivered in San Francisco at 6 o'clock Wednesday evening and on Friday afternoon replies were received in New York, the elapsed time for the completed correspondence being 72 hr. and 13 min. The fastest possible delivery of the mail by train one way between terminals is 91 hr. The air time for the round trip across the

continent including an 11 hr. 36 min. layover in San Francisco was thus actually 18 hr. 47 min. shorter than the minimum time required for a letter to travel by train one way. This was recognized as shrinking the business map of the United States to less than one-third its present size.

"The dozen or more flying meets held throughout the country were essentially commercial demonstrations, though most of the racing was done with military and naval equipment. The most important flying meet was held in St. Louis, Oct. 1 to 6, inclusive, and attracted to that city nearly 125 commercial craft from points as far distant as both seaboards. Three hundred thousand miles of flying were accomplished at St. Louis, much of it cross-country, without a single serious injury. Probably more airplanes were concentrated in St. Louis than were in existence throughout the world ten years ago. This meet marked the first long cross-country flights of the Shenandoah and the Air Service's bombing triplane, equipped with six engines, and which flew with a gross load of 33,570 lb.—the biggest airplane in existence. At all the meets, it is conservatively estimated more than 1,000,000 spectators were present. During the St. Louis meet the Aero Congress of the National Aeronautic Association and the Air Institute of the Aeronautical Chamber of Commerce were held. At the latter, papers were submitted by the Postmaster General, the Secretaries of Agriculture and Interior, the Commandant of the Coast Guard and others, illustrating how aircraft were "put to work" during the year.

"Outstanding examples cited were the forest patrol and reseeding flights for vast conservation or reclamation projects; the dusting of orchards in New England to destroy the gypsy moth and of cotton fields in the south to combat the boll weevil; and the utilization of aircraft by the Coast Guard in saving life and property at sea and in enforcing the prohibition laws. The gypsy moth operations were conducted with a small non-rigid airship and those in the cotton fields with airplanes. The Southern Field Crop Investigations, of the Bureau of Entomology, Department of Agriculture, reported that by dusting the fields from the air millions of dollars could be conserved each year. The department is about to purchase specially constructed planes for this purpose.

"Aerial photography was sought by many municipalities and private corporations. New York City was mapped during the year, American aerial photographic companies have extended their operations into Canada, South America and Europe. The use of aircraft for advertising increased enormously and large corporations availed themselves of the unique publicity offered by sky writing or by night flying with electrically illuminated planes."

Air Mail Halted for Three Days

The daily mail schedule of the Air Mail Service was suspended on Dec. 28, 1923, for three days under an order issued by Postmaster General New. The reason for this measure was a desire on the part of the postal authorities to make certain that no defective airplane equipment is being used by the Service.

The Air Mail recently lost in crashes two of its best pilots, Howard C. Brown and J. F. ("Dinty") Moore, and while there is no evidence to show that their deaths, which occurred in very bad weather, were due to faulty equipment, the Service wanted to make a complete inspection of the equipment now in use.

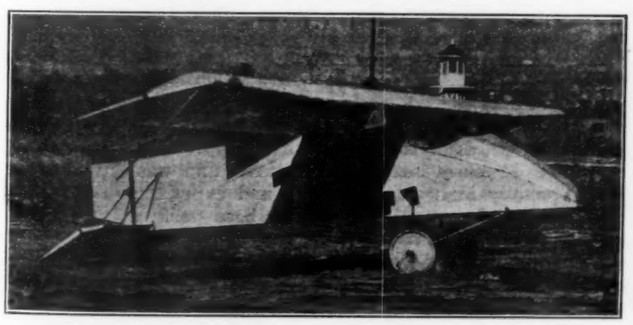
California Students Build Monoplane Glider

By A. C. MERRILL

The characteristics of the cantilever-mono-sail-plane built at the California Institute of Technology, Pasadena, Calif. are as follows:

Surface .....Fage and Collins No. 5
Span .....40 ft.
Chord .....4.5 ft.
Area with ailerons ..180 sq. ft.
Weight with pilot ...400 lb.
Best L/D .....12.3 from tunnel tests (VL = 11)
Minimum sinking V .2.7 ft./sec. from tunnel tests and Madelung's formula
Loading .....2.22 lb./sq. ft.

The machine was built by Gerard Vultee and Louis Kiesling two students at C.I.T. and by Walter Claverie, who was a civilian instructor in flying during the war. Mr. Claverie made all of the metal work and piloted the ship. When the machine was completed it was weighed up and it was found



Cantilever monoplane glider built by students of the California Institute of Technology

that the c.g. was off 1.75 in. We had designed so that the pilot and controls could be moved and by making the proper adjustments we got the proper balance. The flights were made by towing the machine with a 300 ft. cable behind an automobile, there being a positive release at the pilot's hand. The pilot went up as high as he cared to go and then cut loose, gliding back to the field. On the first day's trial the machine flew very well and was perfectly balanced but of course was slow on the controls due to its light loading and slow speed. The moment of inertia of the big wing is such that a yaw once started is very hard to stop with the rudder we now have. The general design, as shown in the pictures, follows the Hannover closely and personally I do not like this design. The rudder is about one half as large as it should be and the fin area of the fuselage produces altogether too large a positive yawing couple. I believe the machine would go into a tail spin very easily and be very hard to bring out.

This work is part of a course I have given to special seniors. Since I am responsible for it, if the machine had failed I would have been to blame, but as the machine is a success with no changes and since I had to interfere with the boys very little, all of the credit belongs to them. Especially I wish to call attention to the work of the pilot Mr. Claverie. I have followed this game now since 1893, that is for thirty years and I have never found in any one man the valuable traits I have discovered in Mr. Claverie. In the first place he is a remarkably skillful pilot. This is shown by the fact that although he has had no training in gliding, always having flown high powered machines, he flew our machine from the start and has never damaged it in the many flights he has made. On one occasion as a matter of experiment he purposely pan-caked the machine to test the landing gear. He bent the left axle close to the wheel but we bent it back again and have beeen using it ever since. In the second place Mr. Claverie is a fine craftsman in metals doing work which is as good as the best the government can put out, and third and most important of all, he has imagination and enthusiasm for the game. When controlled by a technically trained man Mr. Claverie is a find, so far as research in aeronautics is concerned.

The maximum height we have reached with a 300 ft. cable is 215 ft. This was measured by two theodolites from a base line. These experiments are only preliminary. I intend to put on to the machine instruments for measuring inclination, incidence and path speed and get simultaneous records photographically.

Lieut. Macready's Attempt for Altitude Record

Altitude of Between 36,000 and 37,000 ft. Reached by Former World's Altitude Recordman

Mechanical troubles foiled Lieut. John A. Macready's attempt on Dec. 7 from McCook Field, Dayton, Ohio, to regain for the United States the world's record for altitude, and he was forced to land after 1 hr. 28 min. in the air.

At the take-off the engine and supercharger apparently functioned perfectly up to 10,000 ft. Above 10,000 ft. the gage registering the supercharged pressure oscillated, indicating considerable variation in the amount of supercharging. It was, however, possible by manipulation of the central gates to maintain the pressure at the carburetor to the desired amount. An altitude of between 36,000 and 37,000 ft. indicated, which calibrated down to approximately 32,000 ft., was reached in 49 min., when suddenly the supercharger ceased to function, and although the throttle was wide open the revolutions per minute dropped to approximately 300.

Lieutenant Macready kept his throttle wide open coming down in the glide to avoid freezing the water in engine and radiator. The engine revolutions picked up around 7,000 ft., where it was also possible to supercharge again, but due to the large amount of fuel which had been used, a further attempt at climb was abandoned.

Supercharger Broke Down

Upon examination of the supercharger after landing, it was found that the thrust bearing at the front end of the supercharger was badly burned and apparently had been frozen. This is undoubtedly the cause of the fluctuations in the amount of supercharging noted above 10,000 ft., as well as the complete failure of the supercharger to function at the peak of the climb.

The strut temperature at the highest altitude was minus 46 deg. C, and the cockpit temperature was minus 44 deg. C.

It is contemplated using a modified form of the present thrust bearing on the next attempt at the altitude record.

When Lieutenant Macready established his world's altitude record of 34,509.5 ft. on Sept. 28, 1921, it was generally thought that his mark would withstand the onslaughts of rival airmen for some time to come. It remained, however, for Sadi Lecointe, one of the foremost pilots of France, to eclipse this record a little over two years later, for on Oct. 30 last at Villesauvage, France, he ascended in his Nieuport-Delage airplane to an altitude of 36,564 ft.

The Army Air Service, by virtue of the altitude flights of Major Schroeder and Lieutenant Macready, held the world's altitude record practically since the close of the World War, and a general feeling prevailed in Air Service circles that with the new and improved supercharger, that remarkable invention of Dr. Sanford A. Moss which enables an aviation engine to function efficiently in rarefied atmosphere under approximately sea level conditions, no difficulty would be experienced in regaining this highly important aviation record.

A Veteran Plane

The old Lepère (P53) which on three previous occasions had been piloted to heights never before attained by a human being, had been thoroughy primed at McCook Field, Dayton, Ohio, for the supreme test. It had been subjected to a number of tests in which Lieutenant Macready took an active part. The new Moss-General Electric Co. supercharger with which it is equipped resembles in some respects the old "Form B" supercharger, but the speed of the turbine wheel has been increased from 22,000 to 34,000 r.p.m. When the turbine and impeller of this supercharger were tested, they were given an overspeed run of 41,000 r.p.m. The tip speed of the impeller was 1880 ft./sec., three-fourths of the speed of an army rifle bullet. At this rate, a one-pound weight having its center of gravity at the center of gravity of one of the turbine buckets would have a centrifugal force of 222,000 lb. The weight of a bucket is 0.00959 lb., but even so the pull on each bucket is 1750 lb., and as the cross section of the bucket is the small fraction of an inch, the stress is very high. The turbine and shaft were machined from a solid forged mass, weighing 250 lb. The finished weight of the turbine is only 20 lb., 8 per cent of the original forging. A commercial compressor delivering the same amount of air as this supercharger would weigh 5,000 lb. and occupy a space of 6 ft. by 6 ft. by 8 ft. One man can easily carry this supercharger about, but at 35,000 ft. it increases the power of the Liberty engine by over 300 hp.

What the Supercharger Does

People wonder what a supercharger is, and just what it does. An airplane engine loses power as it reaches higher altitudes—the air is less dense the higher one goes, and like a man climbing a hill, the engine literally puffs for breath, for on the weight of air that it sucks in at each stroke depends its power. At sea level a Liberty engine will develop 400 hp.; at 15,000 ft. it will give but 200, and at 25,000 ft. the same engine can only deliver 87 hp., a small fraction of its original output. No wonder something is needed to keep up its "pep." This is the function of the supercharger—it is a high speed centrifugal air pump driven by an exhaust gas turbine. When the charge in the engine cylinder has done all the useful work it can there, it still has power left in it. This the supercharger turbine converts into useful work, driving the compress that pumps air to the engine at constant sea level pressure, and so maintains its original power regardless of the altitude at which it may be flying.

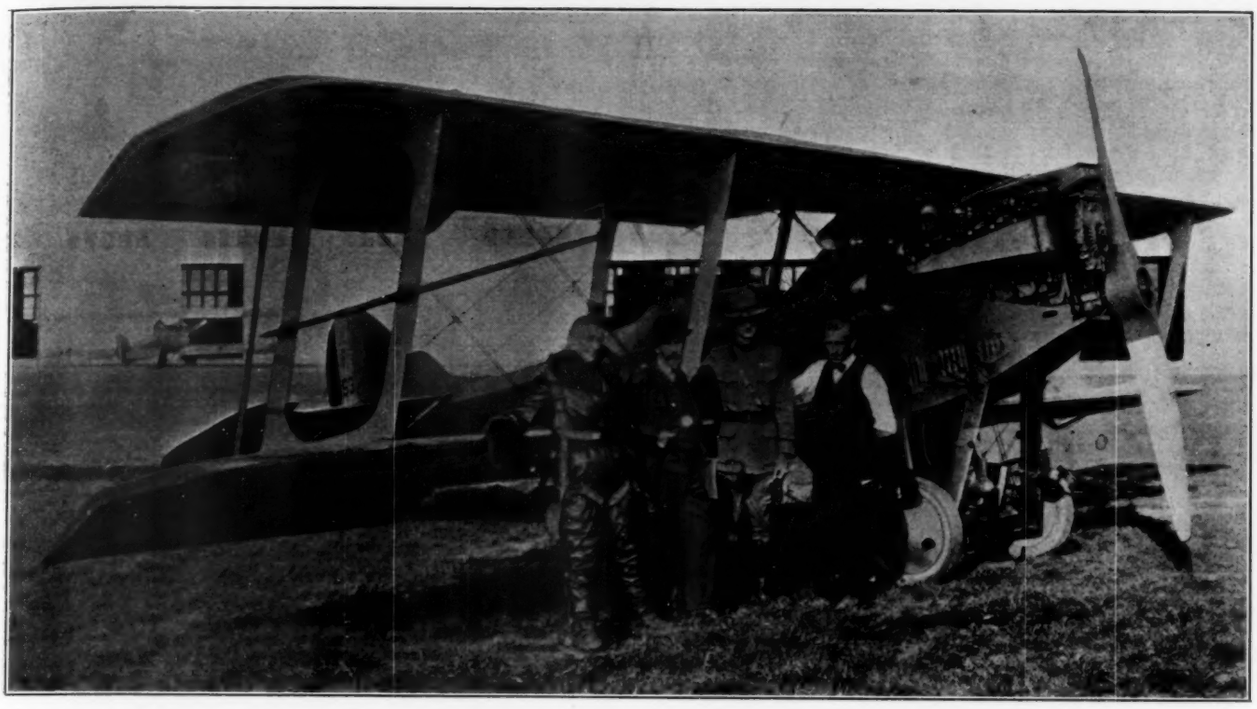
In constructing the supercharger, the first and most serious trouble was securing a material that would stand up under the terrific temperatures, surrounded by white hot exhaust gas. When the supercharger is in full operation the nozzle box and manifolds are sizzling hot, and the fast spinning turbine wheel is surrounded by gases the temperature of which is 1500 deg. Fahrenheit. No wonder pilots thought they were being offered a combination cook stove, blacksmith forge, and flying junk shop. But one by one the various troubles were met. Flexible manifold connections helped overcome warped and cracked joints, and leaky connections. The tips of the turbine wheels were ground off to lighten the dead weight, and to decrease the stress due to centrifugal force. Then came the design of the side type supercharger. The turbine wheel was overhung and exposed to the full blast of the propeller. The compressor casing mounted sideways cut down the head resistance. The whole installation was simple, easily adjusted and, best of all, it worked. The first outfit was run for over 50 hr. without the slightest attention. It is now the standard type—reliable, rugged, and easily taken care of. It increases the performance of an airplane to a remarkable extent.

Liquid Oxygen to be Used

The new and improved supercharger, previously mentioned, has a great many interesting features, and was designed for exceptionally high altitude flying and experimental work.

Further refinement of design has been perfected in the last two years, or since the establishment of the last world altitude record in the United States, in cooling and fuel systems. Also to make the flight a little less grueling for the pilot, a system for heating the cockpit has been devised, as well as material improvements in the supplying of oxygen. Recent tests in the use of liquid oxygen for altitude work make it probable that this will be used instead of gaseous oxygen used in former tests. Its absolute tastelessness is one of the advantages in adding to the comfort of the pilot, while its complete dryness precludes the possibility of the formation of ice in the supply lines from the freezing of moisture, clogging the supply.

It has been rather amusing to hear of the effect of altitude on some of the men who have been taking the Lepère up for various tests in the interest of the recent trial flight. The



The Lepere biplane fitted with the Moss supercharger on which Lieut. J. A. Macready made a world's altitude record of 34,509 ft. on Sept. 28, 1921. Left to right: Lieut. J. A. Macready, Sanford A. Moss, inventor of the supercharger, Capt. G. E. A. Hallett, A. Berger

notes they brought down at times caused those who were waiting for them to scratch an ear, thoroughly puzzled. For instance, a man fully intending to write the figure 18 will write the figure 81, which will cause the supercharger expert a bad half hour until he finds the writer, who is as suprised as he over the discrepancy.

Some of the Difficulties

The supercharger expert himself, when up one day, kept reading the sealed altimeter in the reverse direction, trying to communicate frantically to the pilot that he was running the supercharger for 20,000 ft. below sea level. Nor could he realize until he came down to more normal air pressure, he said, the queer twist in his reasoning that caused the misconception. It is not alone the lack of oxygen in the air which works his hardship upon a man mentally and physically, it is the difference in pressure from that in which for countless thousands of years he has accustomed himself to exist. Each muscle and artery, each convolution of the brain protests in strain and lowered vitality for being forced through that strange bourne, which through all time has never held human breathing organism before. Artificial oxygen can only partly relieve this difference. For the rest it is a grim grinding fight between man and his own endurance, a fight which must be waged subconsciously, since all conscious concentration is given to keeping his plane climbing, to the proper functioning of his engine, which is also fighting mechanically for continued vitality. With his instruments he is not so much concerned. They will tell their own story if safely brought to earth. To force the plane to its ceiling, whatever that altitude may be, it is for that that he struggles to keep his hold on consciousness.

When he made his last altitude record, Lieutenant Macready succeeded in doing this. "The plane wallowed about as in a trough, " he said afterward, "she would go no higher."

This perhaps is the most heroic test which an aviator is called upon to make. There is no audience, nothing to keep up the morale through that hour that may well seem ages, no one even knows there is a story until it is all over.

Just now Lieutenant Macready is sporting a bunged up eye, in which a piece of steel became imbedded when he recently took the Lepère up for a test flight. His grin, however, we are glad to say, sustained no injury.

New Rate-of-Climb Indicator

A valuable addition to the existing aircraft instruments is the Rate-of-Climb Indicator, just produced by the Pioneer Instrument Co. under the Lawrence Sperry Aircraft Company's patent 1,338,358, under which the Pioneer company holds a license which is exclusive except for certain rights reserved by the owners.

The usefulness of the Rate-of-Climb Indicator is not limited to test work, as many people have supposed. It is a thoroughly practical instrument for service flying, enabling the pilot to hold either a maximum climb or a minimum glide without danger of stalling. With its aid a pilot can take a perfectly strange ship and secure the maximum possible performance under any existing conditions, entirely independent of speed, power, or loading—something which is otherwise so difficult as to be practically impossible.

The Rate of Climb Indicator is direct reading and accurate for all conditions. It is not necessary to make any corrections or allowances. Unlike an altimeter, its indications do not vary with the elevation, but read directly in terms of rate of change of altitude. In other words, it shows the vertical component of the speed of the aircraft. It is equally suitable for airplanes or balloons.

Further details of this interesting instrument may be had upon application from the Pioneer Instrument Co., 754 Lexington Ave., Brooklyn, N. Y.

Fighting the Boll Weevil from the Air

Airplanes used to deal destruction to the boll weevil, enemy of the cotton fields, and other similar insects, by scattering calcium arsenate dust on the pests, have done good work, the Department of Agriculture has announced. The planes have opened up such possibilities in this service that the Department has felt warranted in conducting experiments for the development of planes and equipment designed for this purpose, according as funds available permit.

Chicago Gives $15,000 to Army Relief Fund

As a result of the aerial carnival staged by the Air Service for the benefit of the Army Relief Society on Nov. 11 last at Ashburn Field, Chicago, $15,000 was collected for the relief of suffering among the widows and orphans of Army men.

A Radio Speech by Orville Wright

A speech, written by Orville Wright on the twentieth anniversary of the first successful flight of a motored airplane, was recently broadcasted from Dayton, Ohio. Following are some salient passages of this speech, which was relayed throughout the country and also to England:—

"In our inexperienced hands that first machine resembled something between a bucking broncho and a roller coaster. We intended to fly it at a uniform height of about 6 ft. from the ground, which we thought would be safest, but in some of its antics, in spite of all our efforts to keep it down it made its altitude record of a little more than 15 ft.

"If the machine which Macready and Kelly used this year in making their endurance and distance records had existed twenty years ago, when there were no trained pilots, and had been in the hands of a novice, I suspect it never would have left the ground at all, so much of its success depended on the skill of the pilot; and there would have been another demonstration of the impossibility of the flight! And if the racing plane used by Willams last October in making his speed record of 265 mi./hr. had been in the hands of a novice taking his first lesson in flight all by himself, any one can make a guess for himself whether he would have broken the 1903 record of 59 sec.!

"Aviation offers little opportunity to the inventor with a happy idea. The improvement of the airplane is now the product of highly specialized work, and is becoming more so year by year. Of the thousands of suggestions offered in the last twenty years by the layman, I cannot think of one which has contributed materially to the improvement of the plane. I do not mean to discourage invention, but am merely trying to point out to the man on the street that, however original and brilliant he may be, he has practically no chance of making any contribution of value in the field of aviation without first preparing himself by a thorough study of the general principles of aerodynamics.

"Twenty years ago my brother and I thought that the airplane's use would be principally scouting in warfare, carrying mail and other light loads to places inaccessible by rail or water, and sport. But the wildest stretch of the imagination of that time would not have permitted us to believe that within a space of fifteen years actually thousands of these machines would be in the air engaged in deadly combat. Our expectation of its value in scouting has been fulfilled. Surprise attacks which formerly won battles are now impossible. But we did not foresee the extent to which the airplane might be used in carrying the battle line to the industrial centers and into the midst of non-combatants, though we did think it might be used in dropping an occasional bomb about the heads of the rulers who declared war and stayed at home. The possibilities of the airplane for destruction by bomb and poison gas have been so increased since the last war that the mind is staggered in attempting to picture the horrors of the next one. The airplane, in forcing upon governments a realization of the possibilities for destruction has actually become a powerful instrument for peace."

International Air Congress Report

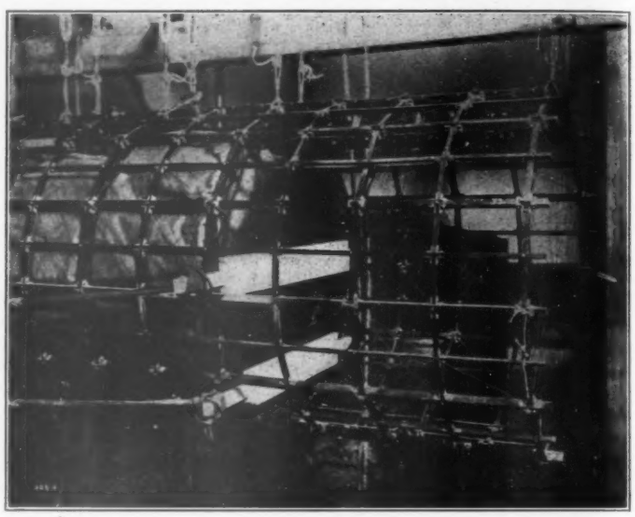
The Report of the International Air Congress held in London last June will be published at the end of the present month. It will be remembered that the Congress was opened by H.R.H. the Prince of Wales, H.R.H. the Duke of York being President, and the Duke of Sutherland Chairman of the Committee. The Congress was attended by 552 delegates from 20 countries representing every phase of aeronautical activity, and was described at the time as far exceeding in interest and importance all previous aeronautical congresses. The Report, which is bound in cloth, occupies 1000 pages and not only contains the 63 papers read during the week, with a verbatim report of the discussion on each, but also includes additional papers which were not read owing to lack of time.

Every question of importance to those interested in air development is dealt with, some of the subjects covered being: Research, Instruments, Propellers, Aero Engines, Fuels and Lubricants, Standardization, Winter and Night Flying, Air Mails, the Law of the Air, Commercial Aviation, Medical Selection and Care of Pilots, Navigation, Insurance, Aerial Surveying and Airships.

The Report has been edited by Lt. Col. W. Lockwood Marsh (General Secretary of the Congress) and will be obtainable from the offices of the Royal Aeronautical Society, 7, Albemarle Street, London, W.1. price 25s. 0d.

M.I.T. Tests ZR1 Model

A study of a celluloid model of the airship ZR1 by means of photoelastic methods has been carried on during the past ten months in the laboratories of the Massachusetts Institute of Technology. No definite statement of the results of the tests can be made, but Navy Department officials have expressed themselves as well pleased with the data obtained.



Part of the celluloid model of the ZR1 tested in the M.I.T. laboratory

It is believed that these tests will be of distinct value and of material aid in the design of airships to prevent a repetition of the ZR2 and Roma disasters.

The model consists of severel thousand pieces of celluloid machined precisely to scale and fitted together in a miniature duplicate of the airship. The testing was performed in the photoelastic laboratory of the Department of Physics by Dr. Paul Heymans and T. H. Frost, of the Technology staff, under the general supervision of Professor Charles L. Norton, Head of the Department of Physics.

The phenomena of photoelasticity have been known to science for some time, but have been employed only recently to settle troublesome problems of structural design, many of which cannot be mathematically determined. By this method polarized light is passed through the celluloid of the model under different loading conditions, and the stresses appear in rainbow colors. Since celluloid acts structurally, as do metals used in construction, it is possible by varying the loads on the laboratory model, to determine just how the airship itself will act under various conditions.

As Professor Heymans states: "By this photoelastic method we can look into the vast and intricate network of the dirigible and see exactly what is going on when it is laboring. We can see how she is carrying and distributing the load. We have made an analysis of the ZR1, seeing exactly how the stresses are taken up by the members of the frame and the wires. When we hear of new forces which the ship must meet in its ventures overhead we can try them out on the model here at Technology."

The Technology Department of Physics of the M.I.T. is the only laboratory in this hemisphere equipped to carry on this work.

U. S. ARMY AND NAVY AIR FORCES

U. S. ARMY AIR SERVICE

World Flight Pilots Designated

Announcement was made on Jan. 4 by Maj. Gen Mason M. Patrick, Chief of Air Service, that the following-named officers of the Army Air Service have been designated to participate in the around-the-world flight which is to start next Spring, viz: Maj. Frederick L. Martin, Commanding; Lieuts. Lowell H. Smith, Erik H. Nelson and Leigh Wade; with Lieuts. Leslie P. Arnold and LeClaire D. Schulze as alternates.

Major Martin was born in Indiana on Nov. 26, 1882. He graduated in mechanical engineering from Purdue University. He was commissioned a Second Lieutenant in the Coast Artillery Corps on Sept. 25, 1908; promoted 1st Lieutenant March 11, 1911, and Captain July 1, 1916. On July 1, 1920, he was transferred to the Army Air Service with the rank of Major. He is a graduate of the Coast Artillery School, Class of 1913. During the World War he was detailed to the Aviation Service and served in Washington, D. C., and overseas in connection with supply matters. He received his flying training at Bolling Field, Anacostia, D. C., and at Carlstrom Field, Arcadia, Fla. He completed his advanced flying training as bombardment pilot at Kelly Field, San Antonio, Tex., and was officially rated as an airplane pilot on Aug. 4, 1921. Major Martin is now serving as Commanding Officer of the Air Service Technical School at Chanute Field, Rantoul, Ill.

Lieut. Lowell H. Smith, A.S., was born at Santa Barbara, Calif., Oct. 8, 1892. Upon America's entry into the 1914-18 War Lieutenant Smith enlisted as a private in the Aviation Section, Signal Corps. Completing his flying training, he was commissioned a 1st Lieutenant in December, 1917, and promoted Captain, October, 1918. He was commissioned 1st Lieutenant in the Regular Army, July 1, 1920. During 1918 he received Handley-Page and heavy bombardment training in England. Participating in the Transcontinental Reliability and Endurance Contest from New York to San Francisco in 1919, he was ahead of all the contestants from the west coast to Chicago, where an unavoidable delay deprived him of an opportunity to win this contest. He particularly distinguished himself in the work of the airplane forest fire patrol carried out through California and Washington during the fire seasons of 1920 and 1921. Lieutenant Smith flew one of the Army airplanes in the Liberty Engine Builders' Race at St. Louis in October, 1923, in which event he finished third. He gained considerable fame in 1923 when he and Lieutenant Richter carried out a non-stop refueling airplane flight for a duration of over 36 hr. In connection with these tests he later carried out a non-stop flight from the Canadian to the Mexican Border, his plane being twice refueled in the air during the flight. Lieutenant Smith has a total flying time of approximately 1,700 hr., of which over 1,000 hr. are cross-country. He has flown approximately 100,000 mi.

Lieut. Leigh Wade, A.S., was born at Cassopolis, Mich., Feb. 2, 1896. He served as a private in the Michigan National Guard from June, 1916, until the entry of the United States in the 1914-18 War, at which time he was transferred to the Aviation Section, Signal Corps, and in December, 1917, he was commissioned 1st Lieutenant. He received his flying training with the Royal Air Force at Toronto, Canada. Upon qualifying as a pilot, he immediately became a flying instructor with the Royal Air Force and later in the U. S. Army Air Service. He served in the A.E.F. in France from August, 1918, until July, 1919, during which time he acted as test pilot, instructor, and then as commanding officer of the 120th Aero Squadron at one of the large American training centers in France. After the Armistice he was on duty in the Technical Information Section of the Air Service in Paris. Upon his return to the United States he was assigned to duty at McCook Field, Dayton, Ohio, where he carried out the work of test pilot, flying all types of American airplane equipment. Lieutenant Wade is considered one of the best pilots in the Air Service. He has had considerable photographic work and participated in many photographic expeditions of note, chief among which being the mission carried out in the White Mountains of New Hampshire and Vermont in 1921. He participated in the bombing maneuvers which resulted in the sinking of three German ships off the Virginia coast. He now holds the altitude record for the Martin Bomber. Until recently he has been the engineer officer at Bolling Fied, D. C.

Lieut. Erik H. Nelson, A.S., was born at Stockholm, Sweden, June 12, 1888. He was by profession an aeronautical motor expert, and prior to his entry into the military service has seven years' experience in the United States and abroad on internal combustion engines. He served with the Curtiss Aeroplane Co. as aeronautical motor expert. Joining the Aviation Service during the war and completing his flying training, he was commissioned a 2nd Lieutenant in April, 1918. He was commissioned a 1st Lieutenant in the Regular Army in June, 1920.

Lieutenant Nelson has many notable flying achievements to his credit and has, perhaps, a greater amount of cross-country experience, flying over different types of terrain, than any other officer in the Army Air Service. Among the notable flights in which he participated and was in a great measure responsible for the success of, were: Gulf to Pacific Flight in 1919; Alaskan Flying Expedition from New York to Nome, Alaska, in 1920, on which flight he acted in the capacity of engineer officer; San Antonio to Porto Rico flight in 1923, in which he again acted in the capacity of engineer officer; 1922 Detroit News Aerial Mail Trophy Race, which he won in a Martin Bomber, averaging 110 mi./hr.

Lieutenant Nelson has also approximately 1,600 flying hours, of which 800 have been cross-country. At the time Lieutenant Nelson was chosen to participate in the round-the-world flight he was acting in the capacity of maintenance liaison officer of all Air Service activities in the United States.

Lieut. Leslie P. Arnold, A.S., alternate, was born at New Haven, Conn., Aug. 26, 1893. Enlisting in the Aviation Service during the war, he received his ground instruction at Princeton University and his flying training at Issoudun, France, where he later served as flying instructor until sent to the front with the 1st Observation Squadron. He served with this organization in the zone of advance until the close of the war. Upon the entry of the American forces into the Area of Occupation, Lieutenant Arnold moved up with the 1st Observation Squadron and remained until his return to the United States in July, 1919. He then began special training in photographic work and graduated from the Air Service Photographic School in 1922. His total flying time is 1,500 hr., of which 800 are cross-country. Now stationed at Bolling Field, Anacostia, D. C.

Lieut. L. D. Schulze, A.S., alternate, was born at Los Angeles, July 5, 1891. He received the degree of A.B. from University of California in 1915, and D.J. Leland Stanford University, 1917. Enlisting in the Aviation Service during the War, he received his flying training and was commissioned a 1st Lieutenant in April, 1918. He served in France, and upon completing flying instruction at Tours, proceeded to Italy for monoplane pursuit training. He then returned to France and served at the 3rd Aviation Instruction Center as flying instructor, test pilot and engineer officer throughout the war. Lieutenant Schulze's total flying time is 1,400 hr., of which 500 are cross country.

The above-named officers are being given a thorough course of training at Langley Field, Va., in preparation for the coming flight. Courses in navigation and meteorology as applies to the route are being given by instructors qualified to do this work, supplemented by actual flying of the Douglas airplane with pontoons for water flying, and equipped with the latest Air Service navigation instruments.

Army Orders

Maj. Walter G. Kilner, A.S., detailed member Aeronautical Board, vice Maj. Herbert A. Dargue, A.S., relieved.

Maj. Frederick Henry Harvey, A.S.O.R.C., Union Station, Kansas City, Mo., to active duty Washington for instruction in military supply, Army War College, from Jan. 30 to March 18.

First Lieut. Edward W. Raley, A.S., Kelly Field, to A.S., Panama Canal Dept., by transport leaving New York City Jan. 24.

Following-named A.S. officers, by orders C.O., Philippine Dept., to stations indicated, on completion present foreign service tours: First Lieuts. Edwin E. Aldrin and Harry A. Johnson, McCook Field; First Lieuts. Bernard S. Thompson and William J. McKiernan, jr., Langley Field; First Lieut. Ronald A. Hicks, Mitchel Field; First Lieut. Albert J. Clayton, training Balloon and Airship School, Scott Field; First Lieuts. Frank E. White and Edwin R. McReynolds, Bolling Field; First Lieut. Frank L. Cook, Air Intermediate Depot, Middletown, duty Industrial War Plans Division; Sec. Lieut. John H. Wilson, Selfridge Field; and Sec. Lieut. Carl H. Barrett, Marshall Field.

First Lieut. John Beveridge, Jr., A.S., orders C.O., Philippine Dept., to duty 39 Whitehall St., New York City, on completion present foreign service tours.

Following-named A.S. officers, orders C.O., Philippine Dept., to indicated stations, on completion present foreign service tours: Capt. Gilbert T. Collar, First Lieuts. William S. Gravely, Frank D. Hackett, Harry Weddington, and Henry G. Woodward, to Kelly Field; First Lieuts. Edward L. Searl, jr., Eugene C. Batten, Morton H. McKinnon, Charles R. Evans, and Ray L. Owens, to Brooks Field.

Capt. Clarence L. Midcap, A.S., now at Fitzsimons General Hospital, Denver, to report for examination to Lieut. Col. Kenneth C. Masteller, C.A.C., pres., Army retiring board, that hospital.

One month and fifteen days' leave to Lieut. Col. Charles H. Danforth, A.S., from Jan. 3.

One month's leave to First Lieut. William J. McKiernan, Jr., A.S., on arrival in U. S.

Maj. Walter G. Kilner, A.S., Office, C.A.S., designated A.S. liaison officer with Army War College, vice Capt. Oliver P. Echols, A.S., relieved.

First Lieut. Clarence C. Wilson, A.S., Hawaiian Dept., now under treatment Letterman General Hospital, Presidio, San Francisco, Calif., to Crissy Field, for duty.

First Lieut. Philip Schneeberger, A.S., leave extended ten days.

Capt. William M. Randolph, A.S., Rockwell Field, relieved from duty that station, and after two months' leave from Feb. 20, directed proceed San Francisco; thence to A.S., Panama Canal Dept., transport sailing April 24.

One month's leave to First Lieut. Earl H. DeFort, A.S., effective April 1.

One month's leave to First Lieut. Guy Kirksey, A.S., from March 12.

Three months' leave to First Lieut. John R. Drumm, A.S., from April 1, with permission to return to U. S. via Suez Canal.

All in a Ferry Flight

While on leave of absence at Des Moines, Iowa, Lieut. E. H. DeFord, of Kelly Field, received orders to proceed by rail to Mitchel Field, L. I., N. Y., and upon arrival there, in company with Lieut. W. A. Fredericks, to ferry a Martin Bomber airplane to the San Antonio Air Intermediate Depot.

On the morning of Nov. 25, the pilots took off from Mitchel Field, facing into a forty-mile wind with which they continued to struggle until darkness forced them to seek a landing at Aberdeen, Md. A successful flight from Aberdeen to Bolling Field, D. C., was made on the 26th.

The morning of Nov. 27 saw them again rising for a flight with strong head winds, the flight from Bolling to McCook Field, Dayton, Ohio, taking them 7 hr. 30 min. At McCook Field the pilots were held over four days on account of inclement weather. Taking off from McCook Field at 1.15 p. m., Dec. 1, they landed at Scott Field, Belleville, Ill., at 5.15 p. m. Leaving Scott Field at 9.00 a. m. the following morning with intentions of completing another long leg of the flight that day, they were confronted over St. Louis, Mo., by heavy fog banks which forced them to return to Scott Field.

They left Scott Field again at 11.00 a. m., the same day. Sailing smoothly along until within 50 mi. of Kansas City, Mo., the left engine cut down to 1100 r.p.m., on account of one jet in the front carburetor becoming frozen. They were forced to close the shutters and heat the engine until the jet thawed out. In gliding to land at Kansas City the throttles were found to be frozen slightly open and the engine could not be idled lower than 800 r.p.m. Upon getting the ship on the ground the switches had to be cut in order to stop rolling.

The pilots were again delayed at Kansas City on account of rain. Leaving there on Dec. 5 with a strong tail wind, which continued throughout the flight, they hopped into Kelly Field in 7 hr. 20 min.

General Mitchell Inspects Hawaiian Fields

Brig. General Mitchell, Assistant Chief of Air Service, and his bride, who recently arrived in Honolulu on an Army transport, were greeted off Diamond Head by the largest aggregation of airplanes ever assembled in the Territory.

The two local Army Air Service posts, Luke Field and Wheeler Field, sent out airplane formations which joined forces over Honolulu and flew out to the steamer, conveying to these distinguished guests the "Aloha" of the air forces in the Hawaiian Department.

General Mitchell and Mrs. Mitchell visited Luke Field, and the General flew a Martin Bomber, a DH4B, an MB3A and an SE5, which, with the exception of the "Jenny," makes a complete aggregation of the land type of planes used there. The following afternoon Luke Field gave a reception at which the officers and their wives were given an opportunity to become acquainted with Mrs. Mitchell and the General.

The following days were spent by the General in inspecting Wheeler and Luke Fields, examining the equipment and viewing a few simple evolutions, such as formation take-offs, formation maneuvering, and bombing at the harbor target. He expressed himself as pleased with the work.

An MB3A was loaded on the lighthouse tender Kukui, Nov. 7, and on the evening of that day, the General and Mrs. Mitchell, R. R. Tinkham, Supt. of Lighthouses, Senator Rice of Kauai, and others set forth for the Island of Kauai. Upon reaching it the party became the guests of Senator Rice, who has a home there. The plane was landed for the General's use during his stay. He tried out the new landing field there and pronounced it satisfactory.

On Nov. 18, with Mrs. Mitchell and a few friends, the General started on a tour of the other islands of the Group for the purpose of getting first hand information concerning them and to familiarize himself with the needs of the Air Service in this Department.

Army Pilots Still Combatting Locusts

The correspondent of *Air Service News Letter* at Camp Nichols, Rizal, P. I., states that Lieutenant Weddington and his detail have been busily engaged of late in an effort to exterminate the locusts which have infested certain parts of the Islands, causing great damage to crops. This work is being carried on with great success. The plane being used is a reconstructed Curtiss of the JN type, the front seat having been removed and a hopper installed capable of carrying about 150 lb. of calcium arsenate, which is the medium used to destroy the locust.

The method used in destroying the locust is to fly over the infested area at an altitude of about 15 ft., opening the hopper the desired amount and with the propeller blast as an aid the calcium arsenate is deposited, this spelling destruction to the locusts in their various stages.

19th Pursuit Squadron History

The 19th Service Squadron, A.S., which was demobilized on April 16, 1919, has been reconstituted for historical purposes and consolidated with the present 19th Pursuit Squadron, A.S., which was organized Oct. 1, 1921, at March Field, Calif. The records of the old organization will be transferred to the new organization when funds become available.

U. S. NAVAL AVIATION

CS "Three Purpose" Plane

The CS type, the first of which was recently tested at the naval air station, Anacostia, D.C., combines the functions usually performed by three distinct types—bombing, torpedo launching and long range scouting. The CS is the lightest plane for its horsepower that has ever been built, and, what is just as remarkable, it is able to fly with more than its own weight as a load. In fact with its single engine it is able to carry a greater load than twin-engined bombers that have been in use for the past few years.

In the past it has been necessary to construct different types of planes for the different functions that this plane can fill, so that the CS marks a very important departure from past practice in the design of planes for use in the Navy. The employment of the CS type of plane in fleet operations will without doubt make for much greater efficiency in aircraft performance, and will be of great tactical value, as well as being a probable source of economy in aircraft operations.

The CS plane was constructed by the Curtiss Aeroplane and Motor Co. and is powered with a Wright T2 engine of 650 hp. It is quickly convertible from a seaplane into a landplane, or vice versa. The weight of the plane is about 4,000 lb. The wing span of the CS is 56 ft., its height is 11 ft. and it is 34 ft. long. Fully loaded for a long flight the CS carries fifteen barrels of gasoline and one barrel of lubricating oil. It has a range of about 2200 mi., without landing and without re-fueling. It has a landing speed of 55 mi./hr. and a maximum speed of 105 mi./hr. as a landplane. It is constructed of steel and duralumin except for the wings, which are made of wood and fabric, and are so designed that they can fold back, thus effecting a marked saving in space. This plane is also designed so that it can be launched into the air from a catapult mounted on the deck of a battleship. The CS will also operate from the flying deck of an aircraft carrier. The CS is fully equipped with "all modern improvements," having a radio set for both sending and receiving, two machine guns, lights in the plane for the crew when flying at night, and it is wired for running lights, similar to a battleship or an automobile.

Orders to Officers

Lt. Comdr. Guysbert B. Vroom, detached U.S.S. Langley, to Bu. Engineering, Washington, D. C.

Lieut. Ralph E. Davison, detached Nav. Air Sta., Pensacola, to Bu. Aeronautics, Washington, D. C.

Lieut. William J. Dean (SC) Upon discharge treat. Nav. Hosp. Philadelphia to duty VO Squadron 6, Aircraft Squadrons Scouting Fleet.

Lieut. Harry L. Dodson, detached U.S.S. Sirius, to U.S.S. Langley.

Lieut. William K. Harrill, detached Nav. Air Sta., Anacostia, to Aircraft Squadrons Battle Fleet.

Lieut. James R. Kyle, detached Nav. Air Sta., Hampton Roads, to Naval Aircraft Factory, Philadelphia.

Lieut. Ralph G. Pennoyer, detached Office Nav. Inspr. Aircraft, Friedrichshafen, Germany, to U. S. Orders 9-1-23 to Nav. Air Sta., Lakehurst.

Lieut. Logan C. Ramsey, detached Aircraft Squadrons Scouting Fleet to Nav. Air Sta., Hampton Roads.

Lieut. Herbert C. Rodd, detached U.S.S. Wright, to duty conn. aircraft radio, Bu. Engineering, and additional duty Bu. Aeronautics, Washington, D. C.

Lieut. Edward W. Rounds, (CC) detached Naval Aircraft Factory, Philadelphia, resignation accepted, 12-31-23.

Lieut. (jg) Bailey Connelly, detached U.S.S. Antares, to temp. duty U.S.S. Wright.

Lieut.. (jg) Lisle J Maxson, (CC) detached Office Inspr. Nav. Aircraft, East. Dist., Garden City, L. I., N. Y., to duty as Inspr. Nav. Aircraft, Chance Vought Corp., Long Island City, N. Y.

Ens. George A. Jones, detached U.S.S. Hannibal, to temp. duty Nav. Air Sta., Pensacola.

The following officers to temporary duty under instruction, Nav. Air Sta., Pensacola, Fla.: Lieut. Charles T. S. Gladden; Lieut. Leslie C. Stevens (CC), detached Nav. Aircraft Factory; Lieut. Martin B. Stonestreet, detached Bu. C & R, Navy Department; Lieut. (jg) Delmer S. Fahrney, det. R.S. San Francisco; Lieut. (jg) Herbert C. Behner; Lieut. (jg) Joseph H. Gowan, detached Nav. Air Sta. Lakehurst; Lieut. (jg) Irvin M. Hansen; Lieut. (jg) Rowland D. Hill, detached U.S.S. Milwaukee; Lieut. (jg)) Andrew T. Lamore, detached U.S.S. Chewink; Lieut. (jg) Joel Newson, detached U.S.S. Rochester; Lieut. (jg) Herbert W. Taylor, detached U.S.S. Tacoma; Ens. Clarence V. Conlan, detached U.S.S. Nevada; Ens. Edward C. Ewen, detached Naval Academy; Ens. Leo T. McGowan, detached U.S.S. Mississippi.

Lieut. J. D. Price Has Narrow Escape

With fire from his blazing plane burning the soles of his feet, and expecting the gasoline tank to explode at any moment, Lieut. J. D. Price, U.S.N., was pulled to safety by his mechanic, R E. Burgsten, A.C.M.M., on Dec. 21 at Cheyenne, Wyo. Lieutenant Price, Lieut. B. H. Wyatt and two mechanics, from the Aircraft Squadrons Battle Fleet, recently left San Diego in DH4B planes for a flight to Washington, D. C., where they were to join the newly formed VS Squadron Three, being organized at the Naval Air Station at Anacostia, D. C. One of the stops of the flight was at Cheyenne. While taking off there, handicapped by a heavy load of fuel and the rarefied atmosphere at that elevation, the plane of Lieutenant Price struck a fence with its tail skid, and was unable to clear another fence which was right ahead. The plane struck the second fence and crashed; the gasoline gravity lead broke and fire broke out immediately. The top wing section was forced down on Lieutenant Price, imprisoning him in his cockpit. The machanic, Chief Burgsten, got clear and at once began to extricate the pilot. The flames were gaining rapidly, and had actually reached Lieutenant Price's feet when Burgsten released him. Lieutenant Wyatt, in the other plane, which had taken off, observing the crash and the fire, landed and rushed over to the wreck, which was a mass of flames 25 ft. high by the time he was able to get there.

After the mishap the two mechanics continued on by train, the two officers flying the remaining plane to Washington, which was reached on Dec. 29.

Planes Land Safely after Collision in Air

Two F5L's, from the Naval Air Station at Pensacola, Fla., collided in the air on Dec. 19, in a fog. Instead of a tragedy, the collision merely resulted in forced landings, and slight damage to the planes, with the personnel unhurt. The planes were commanded by Capt. L. G. Merritt, U.S.M.C., and Lieut. (jg) J. E. Shoemaker, U.S.N. The plane of Captain Mcrritt suffered a jammed aileron, and a successful landing was made only by placing a man on the injured wing to balance the plane. Lieutenant Shoemaker's plane had a broken wing tip pontoon.

Aircraft Squadrons Off for Winter Maneuvers

The Commander, Aircraft Squadrons Battle Fleet, and his staff established their offices on board the U.S.S. Aroostook on Monday, Dec. 17. The planes and equipment of the different squadrons were loaded on the U.S.S. Jason, for transportation South. The Jason left San Diego on Dec. 27.

In addition to the squadrons listed in the last issue of the "News Letter" as going south with the Fleet, VF Squadron Two (VE7 planes) will also participate.

Captain Raby Addresses Alabama Engineers

Capt. J. J. Raby, Commandant of the Naval Air Station at Pensacola, Fla., delivered an address on the training of Naval Aviators before the Birmingham, Ala., section of the American Society of Mechanical Engineers and the Alabama Technical Association, on Dec. 19, in Birmingham. In his addresss Captain Raby outlined the training of Naval Aviators, and stressed the completeness of the course through which they must go in order to become fliers for the Navy.

VF Squadron One Completes Gunnery Practice

On Thursday, Dec. 20, VF Squadron One, Aircraft Squadrons Battle Fleet, completed their annual gunnery practice. The Squadron won seven Navy "E's" for the Individual Battle Practice and scored 430 hits in the Formation Battle Practice.

Designs for Airship Tenders

Designs for two airship tenders fitted with mooring masts to secure rigid airships of a type represented by the Shenandoah have practically been completed in the Navy Department following close upon approval by Secretary Denby of the plan for an arctic expedition by aircraft during the coming summer. The two ships to be altered according to the plans drawn up by the Bureau of Construction and Repair have been selected and work on the necessary alterations will soon go forward.

It is as a result of the study of details necessary for an arctic air expedition that the "airship tender" has been evolved. It is the first vessel of this type for which plans have ever been definitely made, and aside from the use which will be made of these vessels with the expedition planned for the arctic, they will be of great value in rendering effective the use of rigid airships with the fleet. The airship tender, like the aircraft carrier, is another step in rendering aviation independent of shore bases. It will provide a mobile base for the airship similar to that which the carrier affords to airplanes, and will enable airships as long distance scouts to accompany surface craft and operate from their mother ship.

The vessels selected for alteration are the Ramapo and the Patoka. Both are at present in use as fuel oil ships and are admirably suited to the new purpose for which they are intended with minor alterations. The Patoka is now in European waters and will arrive back on her present schedule in about one month. The Ramapo is on the west coast and will be available for alteration practically at once.

The changes that will be made in the vessels consist mainly in the addition of a mast of steel framework, triangular in cross section and appropriately braced which will be located close to the stern of the vessel. Provision is also made for carrying seaplanes on the deck of the tender amidships. Some additional space will be provided for increased personnel and it is planned to place sheathing around the bow of the ships extending above the waterline to protect them from floating ice in their cruise in northern waters. The Ramapo and Patoka are single screw ships which recommends them for arctic work, according to Lt. Comdr. Robert Bartlett whose experience with Admiral Peary in the Roosevelt has been drawn upon in the selection made.

When the airship is secured to the mast officers and men will descend to living quarters on the tender. The surface vessel will also supply the necessary stowage for an additional helium supply, spare parts and machine shop facilities.

Visit of the Duke of Sutherland

On Dec. 20, the British Under Secretary of State for Air, the Duke of Sutherland, together with Mr. Watson, the British Consul General at Philadelphia and Wing Commander Christie, British air attaché, visited the Naval Air Station at Lakehurst, N. J., and were taken through the U.S.S. Shenandoah. From Lakehurst the Duke of Sutherland and his party went to Washington, where the Army Air Service station, Bolling Field, and the Naval Air Station at Anacostia, D. C., were visited. The Duke was taken on a flight in a Navy seaplane down the Potomac River as far as Mount Vernon.

A dinner was given in his honor at the Hotel Shoreham by Wing Commander Christie on Dec. 22. There were present at the dinner more than fifty guests, including Maj. Gen. Mason Patrick, U. S. Army, Rear Admiral William A. Moffett, U. S. Navy, Assistant Post Master General Henderson, and others prominent in the aviation activities of this country.

Aircraft Squadrons Have Ambulance Plane

A DH4B has been converted into an ambulance plane by the personnel of VO Squadron Two, Aircraft Squadrons Battle Fleet.

The ship is attractive in appearance, the fuselage being painted white with a green stripe from the engine section to the tail on either side, and bearing on the fuselage and wings the red cross. The fuselage has been built up to accommodate a stokes stretcher. Passengers carried in this compartment during the tests report that the accommodation is comfortable in flight and landing.

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PUBLISHER'S NEWS LETTER

AVIATION appreciates the patronizing "tip" that *Slipstream* offers it in the last issue. If the employees of McCook Field who run this publication "out of hours" as a private publishing venture could hear the expressions of dissatisfaction with their methods they would perhaps take a less self-satisfied attitude. They make reference to the complaints that have been made against this private publishing company which, to use its own words, has announced itself as the "publicity agent" for McCook Field and as publisher of a "house organ" for the employees. It states that a complaint was made that *Slipstream* had an unfair advantage in obtaining news matter and advertising. It claims: "This is an absolutely false impression, as no news is released to *Slipstream* which cannot be secured by other publications." AVIATION has asked the Chief of Air Service many times for information regarding contracts and orders that are in work at McCook Field. We have always been informed that they could not be furnished. Their appearance in *Slipstream* caused a renewal of the request. The Chief of Air Service wrote that "the Chief of the Engineering Division has been directed to discontinue such a practice and this office has been assured it will not occur again." In several issues later similar information which cannot be secured by other magazines was published and again the Chief of Air Service wrote that "I do not believe that you will again have cause for complaint in this regard."

* * * *

AVIATION alone has not been the only publication to bring these improprieties to the attention of the Chief of Air Service. Another publisher quotes the publishers of *Slipstream* as stating that they "are in a position to gain access to the best of the readable news in centralized governmental aeronautical work." The same publisher raises the question: "Is it the policy of the department to permit its employees to publish a magazine and solicit subscriptions and advertising from the general public?" A "house organ" is primarily for the promotion of the morale of employees, but when a "publicity agent" of McCook Field announces in its first issue that it will be "above the plane of the usual house organ and whose pages will be read in every part of the globe," the McCook Field employees can rightfully be considered as attempting to compete with the other aeronautical papers.

* * * *

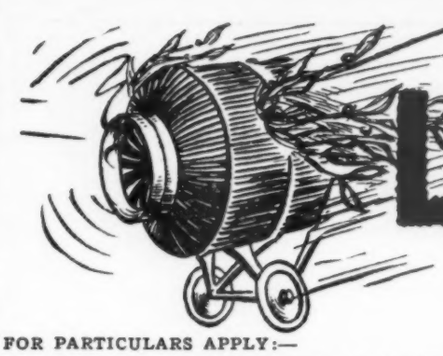
It so happened that before the employees of McCook Field induced the authorities to let them revive the defunct *Slipstream* that they sought financial support for their venture from AVIATION. In their letter they stated: "The material within reach of our organization has hitherto been untouched by any publication in opportune time to succeed in promoting the aeronautical standard anticipated. Our connections in Germany, France, Italy and England are such as to enable us to obtain, etc." As they truly stated, "Since the first appearance of the first number of *Slipstream* away back in August, 1919, the magazine has had a troublesome existence. Twice the magazine was forced to hold up publication until the necessary procedures could be worked out for reinstatement." It is clear that the Engineering Division, prevented from conducting a publication that it desired owing to the correction, by Congress, of publishing abuses in government departments, decided to have a "publicity agent" of its own and made an agreement with a private company composed of its own employees.

* * * *

Mention is also made by the Dayton publication of the solicitation of advertising. If it should have said "highly improper methods of solicitation," it would have been nearer the truth. When advertisers are written to on War Department stationery and solicited for advertising in a privately owned magazine, the conclusion to be drawn is obvious. Again, the Chief of Air Service wrote: "This will not happen again."

Not content with soliciting advertisements on government stationery from companies seeking orders from the government, the magazine goes to the extreme of advocating favoritism in the placing of orders. It tells the employees of McCook Field "If you appreciate the paper, it is your duty to read it from cover to cover and take note of each and every firm represented in it. See what they have to sell and keep them in mind when you are in the market for their goods." Again they ask for "loyalty" to advertisers: "The publishers, therefore, urge that the readers, particularly the employees of McCook Field (all of whom receive copies free) remain loyal to the business firms represented on these pages." Manufacturers of aircraft material who do not advertise are thereby placed at a disadvantage.

There's no place in our government service for such practices and methods, and AVIATION is glad that *Slipstream* has invited a clear statement regarding their activities.



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